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EFFECTS OF A MULTIFACETED TRAINING PROCEDURE ON THE ACQUISITION AND GENERALIZATION OF SOCIAL BEHAVIORS IN LANGUAGE-DISABLED DEAF CHILDREN

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Effects of a multifaceted training procedure were assessed on the acquisition and generalization of social behaviors with 9 language-disabled deaf children. The training procedure consisted of (a) child training and (b) supervision, feedback, and goal setting directed by teachers and residential staff. Target behaviors were turn waiting, initiating interaction, and interacting with others. Procedures to promote generality of effects and to determine the social validity of the procedures were used. Data were collected within a multiple baseline design across behaviors. Results showed a functional relationship between introduction of the training procedure and increases in percentage of appropriate target behaviors for all 9 children. The effects were maintained throughout a 5- to 10-week follow-up period.

DESCRIPTORS: hearing-impaired children, generalization, social skills, social validation, training

During the past two decades, integration of hearing-impaired persons into the community has received high priority. Successful integration depends on both acceptance by normal hearing individuals of hearing-impaired persons and hearing-impaired persons' ability to interact effectively with persons with normal hearing. A number of studies have documented deficits in the social development of hearing-impaired persons. Frequently reported are deficits in empathy (Bachara, Raphael, & Phelan, 1980), communication (Klansek-Kyllo & Rose, 1985), and social perception (Odom, Blanton, & Laukhuf, 1973). Furthermore, the behavior of hearing-impaired persons has been characterized as impulsive, egocentric, and rigid (Meadow, 1976). The prevalence of emotional and behavioral problems in hearing-impaired children has also been estimated to be three to six times higher than in children with normal hearing (Meadow & Schlesinger, 1971; Meadow & Trybus, 1979). Deficits, characteristic features, and emotional and behavioral problems have been attributed to sensory and social deprivation (e.g., Brice, 1985; Evans, 1975; Harris, 1978; Meadow, 1968, 1976). Meadow (1980) contended that social-emotional problems are due to early language deprivation rather than to deafness.

Training of social behaviors as remediation has been conducted with a variety of client populations, including psychiatric adults (e.g., Eisler, Hersen, & Miller, 1974), emotionally disturbed children (e.g., Amish, Gesten, Smith, Clark, & Stark, 1988; Baum, Clark, McCarthy, Sandler, & Carpenter, 1986), learning-disabled children (e.g., Berler, Gross, & Drabman, 1982; Blackbourn, 1989; Gresham & Reschly, 1986; Zigmond & Brownlee, 1980), mentally retarded individuals (e.g., Bates, 1980; Matson & Adkins, 1980; Matson & Andrasik, 1982), autistic individuals (e.g., Mesibov, 1984), blind individuals (e.g., Ammerman, Van Hasselt, Hersen, & Moore, 1989; Van Hasselt, Hersen, Kazdin, Simon, & Mastanuono, 1983), and socially withdrawn children (e.g., Gresham & Evans, 1987; Kratochwill & French, 1984). Various strategies have been used to improve social behaviors, including instruction, modeling, group discussion, role playing, behavior rehearsal, coaching, feedback, homework, and positive reinforcement.

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Although much attention has been given to social deficits of hearing-impaired persons, few studies have evaluated procedures to remediate these deficits. Barton and Osborne (1978) used positive practice to increase sharing with 5 hearing-impaired children. Treatment effects generalized to a new teacher, new toys, and to a class with untrained children. Lemanek and Gresham (1984) assessed the effects of a training package (instruction, live modeling, behavior rehearsal, feedback, and social reinforcement) on specific aspects of social interactions of a 17-year-old deaf female. Speech duration and appropriate content of speech increased, and response latency (i.e., amount of time between termination of a prompt and the individual's initiation of responding) decreased during training. Although speech duration increased and response latency decreased during generalization training, level of responding returned to baseline during follow-up. Lemanek, Williamson, Gresham, and Jensen (1986) replicated this study with 4 hearing-impaired individuals ranging from 11 to 18 years of age, who all increased their speech duration and content during role-play scenes. Two individuals also decreased their response latency during these scenes. Treatment effects generalized to novel role-play scenes and to an analogue situation.

Schloss, Smith, and Schloss (1984) used a combination of a card game, modeling, behavior rehearsal, feedback, and reinforcement with 4 17- and 18-year-old hearing-impaired students to increase their asking questions, criticizing a product or a service, responding to small talk, and reacting to suggestive selling. The training package was effective in increasing the social behaviors of the 4 students during role-play scenes, and treatment effects generalized to untrained role-play scenes and to a natural setting (the local restaurant). Finally, Kreimeyer and Antia (1988) assessed the effectiveness of a training package that included modeling, physical and verbal prompting, and two generalization strategies (i.e., programing common stimuli and training sufficient exemplars; Stokes & Baer, 1977) on sharing, conversation, and positive interaction with preschool hearing-impaired children during instructor-directed intervention and in an untrained free-play setting. Effectiveness was demonstrated during instructor-directed intervention, but generalization to free-play settings occurred only when the above-mentioned generalization strategies were used.

Although these studies demonstrated successful interventions, several issues are noteworthy. First, from a social validity perspective, target behaviors and their appropriate and inappropriate instances should be selected and defined by important social agents of the participants (Wolf, 1978). Lemanek and Gresham (1984) and Lemanek et al. (1986) used baseline performance on the Social Skills Test for Children (SST-C; Williamson, Moody, Granberry, Lethermon, & Blouin, 1983) to select target behaviors for training. The appropriateness of the target behaviors was based on criteria obtained from hearing children. The other three aforementioned studies did not report how and by whom the target behaviors were selected. As for the appropriateness of the target behaviors in their study, Schloss et al. (1984) asked managers of eight businesses to write the most appropriate response to each situation on their 16-item list.

Second, socially relevant interactional situations in natural settings should be selected for the assessment of treatment effects in order to determine the clinical significance of these effects. In the above-mentioned studies, only Barton and Osborne (1978) and Kreimeyer and Antia (1988) selected a socially relevant interactional situation in a natural setting (i.e., free play in the classroom) for the assessment of treatment effects. Lemanek and Gresham (1984), Lemanek et al. (1986), and Schloss et al. (1984) used role-play situations to assess treatment effects. However, role-play assessments of social behavior may have limited generalizability to natural settings (Bellack, 1979; Bellack, Hersen, & Turner, 1978). Schloss et al. (1984) also conducted assessments at a local restaurant to determine generalization of treatment effects.

Third, to promote generality of effects, generalization strategies, as proposed by Stokes and Osnes (1989), should be a part of any treatment for establishing social behaviors. Although all studies reported generalization of treatment effects across a variety of stimuli, generalization was not actively programmed in these studies except by Kreimeyer

and Antia (1988). Generalization was considered something that would occur automatically or not at all.

The present study assessed the effectiveness of a multifaceted training procedure on the acquisition and generalization of three social behaviors with 9 language-disabled deaf children. The training procedure consisted of (a) child training and (b) supervision, feedback, and goal setting directed by teachers and residential staff. Because language-disabled deaf children were involved, many visual aids were incorporated in the child training component of the procedure. The following procedures were used to promote generality of effects. First, the target behaviors and the appropriate and inappropriate instances of these target behaviors were selected by teachers and residential staff. Therefore, these behaviors were presumed to have contact with natural maintaining consequences. Second, training was conducted by teachers and residential staff in various natural environments and during various activities. Third, teachers and residential staff were asked to socially reinforce appropriate instances of the target behaviors. Fourth, tokens were provided on a thinning schedule of reinforcement for appropriate instances of the target behaviors. Fifth, teachers and residential staff were asked to correct inappropriate instances of the target behaviors. Sixth, teachers and residential staff were prompted to use the same training procedures when children showed appropriate or inappropriate instances of the target behaviors. Finally, materials to cue the children to emit the target behaviors were present in all relevant settings. As an index of social validity, teachers and residential staff identified and selected the target behaviors and defined the appropriate and inappropriate instances of the target behaviors. They were also informed about the training procedures on a regular basis prior to administering these procedures.

METHOD

Subjects and Setting

Nine language-disabled deaf children attending the school of a residential facility for the deaf participated. Participants were selected on the basis of their age and their behavioral problems as indicated by their teachers and residential staff members. The 6 girls and 3 boys were enrolled in two different classes. Class 1 contained 4 girls and 1 boy. Class 2 contained 2 girls and 2 boys. The children of Class 1 and 1 boy of Class 2 constituted one living group at the institution. The remaining 3 children lived with their parents. The children, ranging in age from 8 years to 9 years 6 months (M = 8 years 6 months), were diagnosed as dysphatic with severe to profound hearing losses. Their oral communication was supplemented by an oral-graphic method. Children's vocabulary age (Peabody Picture Vocabulary Test) ranged from 2 years 5 months to 4 years 3 months (M = 2 years 11 months).

The ages of the 2 consulting teachers (1 female and 1 male) were 46 and 28 years, and they had been qualified teachers for 19 and 6 years, respectively. The ages of the three female residential staff members involved were 36, 26, and 24 years. They had been certified for 19, 2, and 1 year, respectively. The female psychologist was 33 years old and had been certified for 3 years. Teachers, residential staff, and the psychologist had completed an in-service training.

Response Definitions

Ten behaviors were identified by consulting teachers and residential staff. Teachers and residential staff were asked to select three target behaviors and to define appropriate and inappropriate instances of these target behaviors. The following three behaviors were selected: (a) turn waiting, (b) initiating interaction, and (c) interacting with others. The following instances of target behaviors were recorded.

Appropriate instances of target behaviors. Turn waiting involved the child facing the person involved (i.e., the teacher, a residential staff member, another child), asking for the person's attention once, but the child does not interrupt others and waits; the child does not speak before another person is finished. *Initiating interaction* referred to the child seeking a person's attention by (a) raising a hand, (b) calling once or twice a hearing person's name (e.g., the teacher or residential staff member), or (c) touching once or twice a hearing or a deaf

person (e.g., the teacher or another child). *Interacting with others* was defined as the child showing one of the following behaviors: (a) helping someone; (b) comforting someone; (c) telling someone he or she is kind, funny, or pleasant; and (d) telling someone he or she has done something well.

Inappropriate instances of target behaviors. For *turn waiting,* this was defined as the child starting to speak when another person is speaking, or the child interrupting when another person is on-task. *Initiating interaction* referred to the child seeking a person's attention by showing one or more of the following behaviors: (a) screaming, (b) tapping on the desk, (c) hand flapping, (d) unauthorized out-of-seat, (e) hitting a person, and (f) calling a person's name or touching a person more than twice. *Interacting with others* was defined as the child showing one of the following behaviors: (a) laughing at someone, (b) teasing someone, (c) excluding someone from social activities, (d) sticking out the tongue, and (e) making an inappropriate gesture (e.g., pointing at one's forehead).

Data Collection and Interobserver Agreement

Target behaviors were recorded using an 8-s partial-interval recording procedure. Teachers and residential staff were asked to identify socially relevant interactional situations for recording the target behaviors. Accordingly, turn waiting was recorded in the classroom during grammar lessons. Initiating interaction was recorded when manual training was practiced and in the children's dayroom during dinner. Interacting with others was recorded when manual training was practiced. Each recording sessions lasted 20 min and was videotaped. To reduce reactivity, the camera (a Sony® CCD-V90E) was present in each of the three settings for 2 weeks prior to baseline recordings.

Date were collected by two primary observers using the HyperCard program for the Macintosh® computer. Data collection did not begin until 90% interobserver agreement for the target behaviors had been attained during three consecutive sessions. As an attempt to control for observer drift and bias (Kazdin, 1977a), the following measures were taken: (a) the primary observers were kept naive with respect to the experimental hypothesis; (b) the primary observers were uninformed as to which experimental phase was in effect at a given time; (c) preceding each recording session, observers read the response definitions; and (d) the primary observers never received feedback on the reliability of their scoring.

Interobserver agreement was assessed on an interval-by-interval basis. Reliability checks were conducted in 27% of the recording sessions and were approximately equally distributed across the three target behaviors and across the experimental phases. A kappa statistic (Cohen, 1960) was computed to control for chance agreement. For turn waiting, an average kappa coefficient of .83 (range, .65 to 1.00) was found. For initiating interaction and for interacting with others, the average kappa coefficients were .82 (range, .75 to .94) and .73 (range, .41 to .87), respectively.

Experimental Design

A multiple baseline design across the three target behaviors was employed to assess the functional relationship between training and changes in the frequencies of the three target behaviors. Preceding data collection, teachers, residential staff, and parents had been informed about which target behaviors were selected for training, in order to assess the differential effectiveness of training these behaviors.

Procedure

Baseline. This phase was in effect for 5 weeks for turn waiting, 10 weeks for initiating interaction, and 15 weeks for interacting with others. For Class 1, turn waiting was recorded during five sessions, initiating interaction was recorded during six sessions, and interacting with others was recorded during nine sessions. For Class 2, the number of recording sessions was five, eight, and 11 for turn waiting, initiating interaction, and interacting with others, respectively. Preceding training of the first target behavior, the first author informed teachers and residential staff about the training procedures to be used. One week preceding training of each target behavior, the first author handed teachers

and residential staff (a) the lessons on the target behavior in training, (b) the list of appropriate and inappropriate instances of the target behavior, and (c) the materials to be used when the children showed appropriate or inappropriate instances of the target behavior.

Training. This phase was in effect for 5 weeks for each target behavior. For both classes, turn waiting was recorded during five sessions and initiating interaction was recorded during three sessions. Interacting with others was recorded during two and four sessions for Classes 1 and 2, respectively. The list of appropriate and inappropriate instances of the target behavior was posted in front of the classroom and on the living group floor.

Child training consisted of (a) nine 30-min lessons given by the teacher, (b) contingent reinforcement for each appropriate instance of the target behavior, and (c) a correction procedure for each occurrence of an inappropriate instance of the target behavior. The teacher and residential staff provided the children with contingent reinforcement and administered the correction procedure during school hours and when the children were in their living group.

First, during the first three lessons (given in the 1st week), the teacher prompted the children to emit appropriate and inappropriate instances of the target behavior in training and examples of situations in which the target behavior might occur. Furthermore, the teacher provided the children with verbal and modeled instruction about the consequences of showing the appropriate and inappropriate instances of the target behavior. That is, the teacher practiced the reinforcement procedure and the correction procedure with the children during two or three role-play situations. Following these lessons, six problem-solving lessons were given within a period of 4 weeks. During each two successive problem-solving lessons, the children watched a videotape showing a model (i.e., a hearing child of their chronological age demonstrating one particular appropriate instance of the target behavior). The videotape was displayed until the target behavior occurred. The teacher then prompted the children to discuss the event on the videotape using the following four questions: (a) What is the problem? (b) How can I handle it? (c) How should I respond to it? and (d) Did I choose a correct response? Drawings on the children's worksheets illustrated these four questions. The teacher instructed 1 or 2 children to role play their responses to the third question, and following this, the teacher asked the remaining children whether it was an appropriate response or not. Finally, the children watched the appropriate example of the model on videotape and selected the most appropriate response.

Second, when a child showed appropriate instances of the target behavior during school hours or while with the living group, the teacher or residential staff member provided him or her with verbal praise and a stamp token. Tokens were provided on the basis of individual performance rather than on group performance. During school hours, 10 tokens could be exchanged for objects (e.g., crayons). When the children were with their living group, a group contingency was in effect; 30 tokens could be exchanged for special group activities (e.g., baking pancakes). Teachers and residential staff were prompted to deliver the tokens on a variable schedule in such a way that delivery would not interfere with regular activities. To accomplish maintenance of training effects (Kazdin, 1977b, 1982; Stokes & Osnes, 1989), the schedule of reinforcement was gradually thinned from continuous reinforcement to a variable-ratio 5. For this purpose, teachers and residential staff were handed a diagram of the percentages of appropriate target behavior that needed to be reinforced with tokens each day.

The third component of child training consisted of correcting the children for inappropriate instances of the target behavior. When a child showed an inappropriate instance of the target behavior during school hours or with the living group, the teacher or residential staff member gave the child a booklet with drawings of the four above-mentioned questions. The teacher or residential staff member instructed the child to look at these. For the convenience of teachers or residential staff, correction could also consist of pointing to a poster with the

drawings of the questions and instructing the child to look at these.

Supervision, feedback, and goal setting consisted of two components. First, the psychologist supervised each of the teachers while teaching the lessons and provided them with feedback. For this purpose, the psychologist attended one lesson each week and provided the teacher with verbal performance feedback during a weekly 15-min meeting. Second, the psychologist observed and provided feedback to teachers and residential staff regarding their administration of reinforcement and correction. During the 1st week of training, the first author videotaped teachers' and residential staff members' behavior while they interacted with the children for 20 min. Each of the teachers or staff members then watched the videotape with the psychologist prompting him or her to reinforce and correct target behaviors appropriately. Then, the psychologist prompted teachers and residential staff to attain a goal (i.e., goal setting) set at 80% correct responses to children's appropriate and inappropriate instances of the target behavior. During Weeks 2 through 5, the psychologist was present in the classrooms and in the living group area for 30 min each week and recorded teachers' and staff members' correct and incorrect responses to appropriate and inappropriate instances of the target behavior. During weekly 15-min meetings, the psychologist provided each teacher and staff member with feedback using a graph of the percentage of correct responding to the target behavior. When teachers and staff members met or exceeded the goal, the psychologist praised them and increased the goal for the next week by 15% to 20%. When they failed to meet the goal, the psychologist prompted them to attain the previous goal the next week.

Follow-up. During this phase formal training was discontinued; however, teachers and residential staff were prompted by the first author to continue praising appropriate instances of the target behaviors and to remind the children of the appropriate instances when they showed inappropriate instances of the target behaviors. Furthermore, the lists of appropriate and inappropriate instances of the target behavior, the booklets, and the posters remained in place.

Follow-up was in effect for 10 weeks for turn waiting and 5 weeks for initiating interaction. There was no follow-up phase for interacting with others because the school year ended. Turn waiting was recorded during five and six sessions for Classes 1 and 2, respectively. Initiating interaction was recorded during three sessions for Class 1 and four sessions for Class 2.

RESULTS

The mean percentages of intervals of appropriate and inappropriate instances of the target behaviors observed during the experimental conditions are presented in Figures 1 and 2 for Classes 1 and 2, respectively. Class 1 engaged in more appropriate instances of turn waiting and initiating interaction and fewer inappropriate instances of all three target behaviors during training compared with baseline. The mean percentages of intervals of appropriate instances of interacting with others remained at baseline level during training. The mean percentages of intervals of appropriate instances of turn waiting increased from 1.7 during baseline to 4.6 during training, and the mean percentages of intervals of inappropriate instances decreased from 6.6 during baseline to 3.4 during training. The mean percentages of intervals of appropriate instances of initiating interaction increased from 5.9 during baseline to 8.7 during training, and the percentages of intervals of inappropriate instances decreased from a mean of 4.5 during baseline to 1.5 during training. The mean percentages of intervals of appropriate instances of interacting with others was 1.8 during baseline and 1.7 during training, and the mean percentages of intervals of inappropriate instances was 1.9 during baseline and 0.2 during training. Figure 1 also shows that during follow-up, the mean percentages of intervals of inappropriate instances of turn waiting further decreased to 2.0, whereas the mean percentages of intervals of appropriate instances of turn waiting and initiating interaction remained above baseline level at 8.6 and 7.8, respectively.

Class 2 demonstrated a large increase in the mean percentages of intervals of appropriate instances of turn waiting, from 2.0 during baseline to 13.8

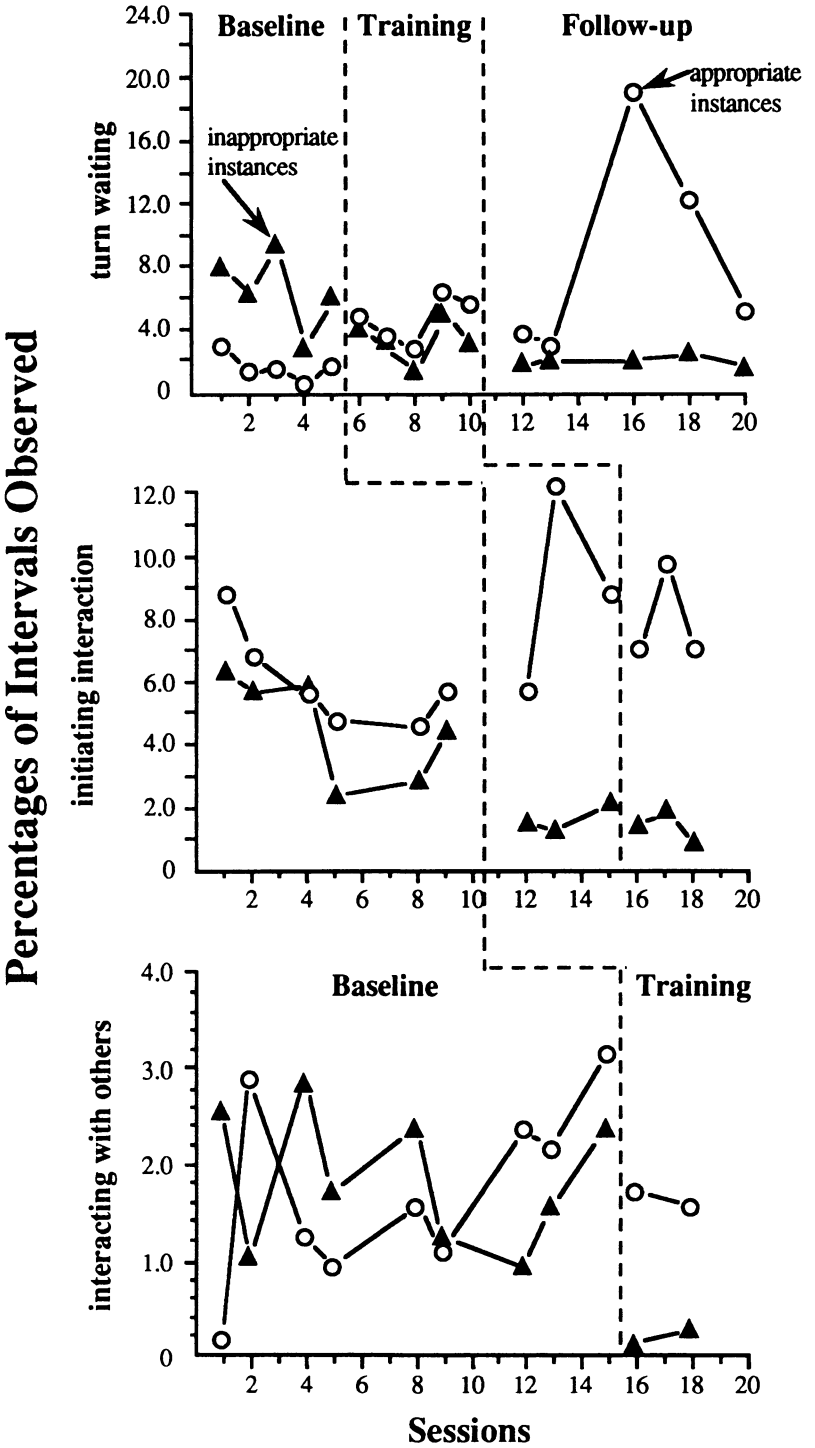

Figure 1. Percentages of intervals in which turn waiting was observed during grammar lessons and percentages of intervals in which initiating interaction and interacting with others were observed during manual training per 20 min in the three experimental conditions for Class 1.

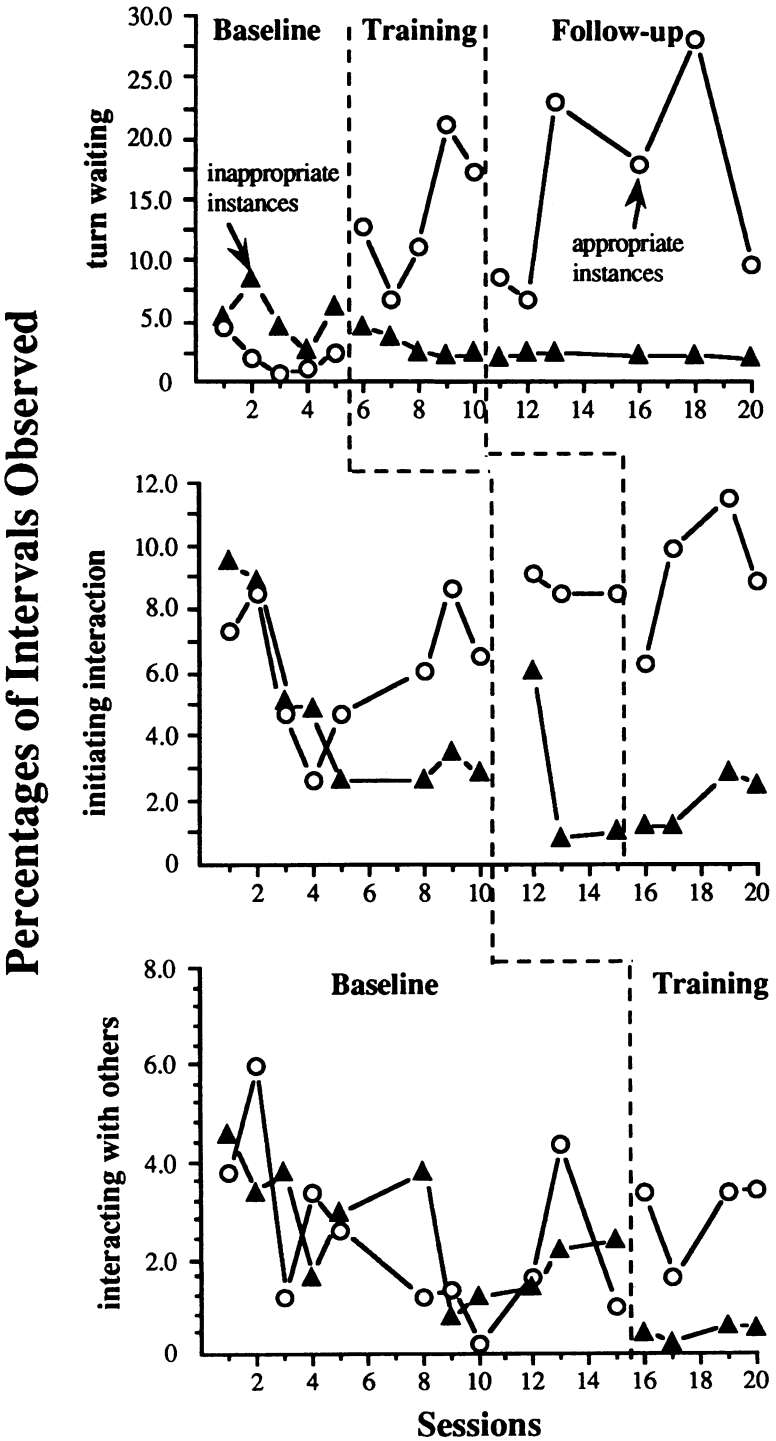

Figure 2. Percentages of intervals in which turn waiting was observed during grammar lessons and percentages of intervals in which initiating interaction and interacting with others were observed during manual training per 20 min in the three experimental conditions for Class 2.

Table 1
Mean Percentage of Appropriate Target Behaviors during the Conditions of Baseline, Training, and Follow-up for the 9 Children

Child	Turn waiting			Initiation interaction			Interacting with others	
	Baseline	Training	Follow-up	Baseline	Training	Follow-up	Baseline	Training
Class 1								
Jacqueline	27.9	62.8	61.6	64.5	94.4	93.3	58.3	100
Anita	21.8	62.0	90.1	70.0	91.7	90.3	41.0	92.9
Tom	13.4	40.9	68.4	51.1	72.0	85.8	34.3	87.5
Susan	21.7	63.4	54.9	53.3	87.7	79.8	51.0	100
Ellen	8.3	50.6	85.6	62.1	79.5	90.9	57.8	100
M	19.9	56.0	72.7	59.4	85.6	87.7	48.4	96.1
Class 2								
Vincent	19.2	74.6	93.8	53.0	89.8	89.2	40.5	100
Norbert	34.2	64.9	66.5	45.4	85.5	72.4	39.7	100
Wanda	16.1	82.2	85.2	59.5	92.8	76.9	50.2	90.0
Maria	27.7	82.7	81.6	70.9	95.6	91.3	53.7	77.5
M	24.3	77.4	81.2	58.0	90.9	81.7	46.4	88.9
Living group								
Jacqueline				38.1	76.6	80.4		
Anita				48.3	88.3	91.7		
Tom				33.4	85.2	78.3		
Susan				29.8	68.8	83.3		
Ellen				31.8	83.3	76.7		
Vincent				31.7	77.1	63.0		
M				34.6	77.3	79.1		

during training (Figure 2). The mean percentages of intervals of inappropriate instances of turn waiting decreased from 5.4 to 3.0 during training compared with baseline and remained below the baseline level during follow-up ($M = 2.1$). The children also showed more appropriate instances of initiating interaction during training. Mean percentages of intervals of appropriate initiating interaction during baseline and training were 6.1 and 8.6, respectively. The mean percentages of intervals of inappropriate instances of initiating interaction decreased from 5.0 to 2.6 during training and remained at training level during follow-up ($M = 1.9$). Mean percentages of intervals of appropriate instances of interacting with others remained at baseline levels during training, whereas mean percentages of intervals of inappropriate instances decreased from 2.6 during baseline to 0.4 during training for the children of Class 2.

Within each experimental condition, the children showed much variation in the frequency of occurrence of the target behaviors. Although the frequency of occurrence of the target behaviors is an important feature from a social validity perspective, a more important parameter is the number of appropriate instances of the target behavior compared to the number of inappropriate instances. For this purpose the percentages of intervals of appropriate instances of the target behavior were divided by the total percentages of intervals of appropriate and inappropriate instances of the target behavior and multiplied by 100.

Table 1 shows the mean percentages of appropriate target behaviors in the conditions of baseline, training, and follow-up for the 9 children. For all children, mean percentage of appropriate turn waiting, appropriate initiating interaction, and appropriate interacting with others increased as a function of the training. For 4 children (Anita, Tom, Ellen, and Vincent), mean percentage of appropriate turn waiting continued to increase during follow-up compared to the training condition. During follow-

up, the mean percentage of appropriate initiating interaction remained at training levels for the children of Class 1 and remained above baseline levels for the children of Class 2.

DISCUSSION

The present study showed that a multifaceted training procedure supplemented with procedures to promote generalization resulted in the increase and generalization of social behaviors with language-disabled deaf children. As a result of training, all 9 deaf children increased their percentages of appropriate turn waiting, appropriate initiating interaction, and appropriate interacting with others. Maintenance of training effects was demonstrated for turn waiting and initiating interaction. For 4 children, the percentage of appropriate turn waiting continued to increase during follow-up. We believe that maintenance of effects during follow-up was due to the inclusion of several generalization strategies. More specifically, conducting training in various settings brought children into contact with the natural consequences of their acquired behaviors, while tokens were faded on a thinning schedule of reinforcement. Recordings were conducted in several natural settings (classroom, manual training room, and children's dayroom), during several activities (grammar lessons, manual training, and dinner), and with several persons (teachers, manual training teacher, and residential staff members).

Although the results of the present study suggest the training was effective, certain qualifications should be made. First, the children showed much variation in the frequency of performing the target behaviors within each experimental condition. This variation may be attributed to several variables, such as task difficulty, task interest, teaching style, and number of occasions for performing the target behaviors. Such influences cannot be excluded in natural settings, but we do not believe they jeopardized the internal validity of the conclusions. For the target behaviors of the present study, the most important parameter defining whether a child is socially adaptive was the appropriateness of the performance when a child had to show the target behavior. Although a social validity perspective considers frequency of occurrence of the target behavior to be important, a criterion frequency for many target behaviors cannot be set for a specific activity in a specific setting.

Second, another possible threat to the internal validity of this study might be the increase in percentage of appropriate initiating interactions when training of turn waiting was in effect for Class 2. This result might be attributed to the teacher's difficulty in inhibiting the use of the training strategies for this target behavior. Another explanation might be that the target behaviors are interdependent. We do not think, however, that the target behaviors involved are interdependent, because there were no increases in percentage of appropriate initiating interactions when training of turn waiting was in effect for Class 1 and for the living group.

Third, no data were collected with respect to the integrity of the independent variable. Peterson, Homer, and Wonderlich (1982) stated that an accurate description and a reliable observation of the independent variable and the dependent variable are equally important for demonstrating a functional relationship. Our failure to collect data on this aspect might indeed threaten internal validity. However, the application of the training procedures by the children's treatment agents was monitored by the psychologist; this offered substantial safeguards against violation of accuracy in administering the independent variables. It is obvious, however, that reinforcement of appropriate instances and correction of inappropriate instances of the target behavior in the natural settings may not have occurred according to the first author's plan. To the extent that there had been some amount of freedom in the application of the training procedures, a robust functional relationship between the independent and dependent variables was affirmed. Fourth, although no formal assessment of social validity was conducted (e.g., by having teachers and residential staff members fill out a questionnaire), we believe social validity was enhanced because important social agents of the participants (a) selected the target behaviors, (b) defined the appropriate and inappropriate instances of the tar-

get behaviors, (c) selected socially relevant situations for data collection, and (d) were informed about the training procedures prior to administering these procedures. Furthermore, teachers and residential staff requested continuation of training of social behaviors for their children.

In summary, this study showed the effectiveness of a multifaceted training procedure in improving social behaviors of language-disabled deaf children. Although the number of children involved was relatively small, we believe the procedures can be used to improve social behaviors with other groups of children in other settings. Future research is needed to analyze the relative contributions of each component of the training procedure. In order to demonstrate external validity of the training procedure, replications should be conducted with other populations, particularly with hearing-impaired children and adolescents in other settings (e.g., settings in which children with hearing impairments are integrated with normal-hearing peers) and with other social behaviors.

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